For the first part of this lab, you will be doing warm-up exercises for Project 1.

Problem 1.

Online Exercise 1 is technically due Oct. 4 23:59, but you should do it now to make sure you know how to use Gradescope.

The exercise must be submitted on Gradescope. The file you submit must be named `exercise_1.py` .

Do the following:

- `parrot_trouble` from the Warmup-1 section
- `sum_double` from the Warmup-1 section
- `sleep_in` from the Warmup-1 section
- A function named `set_square(x)`, which sets the value of the global variable `ret_square` to the square of `x`.

Submit the file `exercise_1.py` to Gradescope, individually.

The CodingBat exercises are linked from the Calendar section of the course website.

Problem 2.

Review the solutions for Lab #2. If you haven't successfully implemented the `undo` functionality, implement it now. Look at the solutions as much as you need to, and seek explanations from the TAs as necessary, but make sure to get to a point where you definitely can do `undo` from scratch.

Problem 3.

Add the function `undo2` to your implementation. The function `undo2` will change the current value to the value *before last.* For example:

```
        # current value is 0
+1      # current value is 1
*2      # current value is 2
undo    # current value is 1
+ 5     # current value is 6
undo2   # current value is 2
```

Hint: when implementing `undo`, we kept track of `prev_value`. Now, you need to keep track of an additional variable.

Problem 4.

Implement a simple simulation that's similar in spirit to Project 1. This is a simulation of an EngSci student. The only functions are:

```
def drink_coffee():
   # your code here

def study(minutes):
   # your code here
```

The following `initialize` function is given

```
def initialize():
   global too_much_coffee
   global current_time
   global last_coffee_time
   global last_coffee_time2
   global knols

   too_much_coffee = False
   current_time = 0
   knols = 0

   last_coffee_time = -100
   last_coffee_time2 = -100
```

The rules are: the students gets 5 knols per minute of study ("knols" are units of knowledge) if they haven't drunk coffee right before the study session, and 10 knols per minute of study if they had a coffee right before the study session.

However, if at any time the student drinks more than 2 cups of coffee over the span of 2 hours, they get 0 knols per hour from there on.

Here is how the code could be used:

```
if __name__ == '__main__':
   initialize()   # start the simulation
   study(60)      # knols = 300
   study(20)      # knols = 400
   drink_coffee() # knols = 400
   study(10)      # knols = 500
   drink_coffee() # knols = 500
   study(10)      # knols = 600
   drink_coffee() # knols = 600, 3rd coffee in 20 minutes
   study(10)      # knols = 600
```

To approach this problem, think of the following:

- Every time the student studies, you need an if-statement to determine how to update `knolws`
- When drinking coffee, need to update the coffee times
- Every time you're studying, need to update the current time

Problem 5.

Work on Project 1.